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CONTENTS:

Smith—Two Freaks: Papilio ajax and Eudamus tityrus..... 191
Pearsall—Eastern Eupithecias..... 192
Swett—Packard's Eupithecias..... 196
Girault—Texas, Virginia and Maryland notes on the Catalpa Sphinx, Ceratomia catalpae Boisduval..... 197
Doane—New Species of the Tipulid genus Rhypholophus, with a Table for Determining the North American species..... 200
Banks—A new genus and species of Neuroptera..... 203
Coolidge and Newcomer—The Life History of Euchloe ausonides Boisd... 204
Felt—Contarinia gossypii n. sp..... 210
Houghton—The Blackberry Leaf-Miner 212
Bowditch—Notes on Pachybrachys.... 216
Saverner—Migrating Butterflies..... 218
Rohwer—Some Larrid Wasps from Colorado..... 220
Wellman—Notes on some Angolan Insects of Economic or Pathologic Importance..... 224
Jones—Callosamia angulifera Walk., n. var. carolina..... 231
Tandy—The Carpenter Mud Wasp.... 231
Editorial 233
Notes and News 234
Doings of Societies..... 236
Obituary—James H. Ridings..... 242
" —Prof. Willis Grant Johnson. 242

Two Freaks:—Papilio ajax and Eudamus tityrus.

BY ELLISON A. SMYTH, JR., Blacksburg, Va.

(Pl. X.)

There has always been a fascination for me in breeding from the egg *Papilio ajax*, and repeating in various combinations Edwards' classical experiment with this species. Doubtless everyone who has bred this fly has noted the varied length of pupation in individuals of the same brood, has had early spring eggs produce one form in a few weeks, others of the same brood bring forth another form in midsummer, still others disclose imagines of a third form in the late fall and some pass over one or even two winters and produce the different forms the second or even the third spring, summer or fall. In a large series bred from eggs laid in June, 1902, which gave *walshii, telamonides* and *marcellus* at appropriate periods, I had one pupa among others last over until April, 1903, when it disclosed a biformed female, the left side of which had only the small white spot at the end of the tail (shall I call it *ajax*

walshii?), and the right half with the terminal caudal spot extended up the sides of the tail (*ajax telamonides*). The accompanying photograph is of this individual, now in my collection. It will be noticed that the apex of the left forewing is apparently not fully developed: the reason for this may also be the cause of the bi-formation.

The other figure is of a specimen of *Eudamus tityrus* with the yellow spots suffused over the apical area of the forewing. It was caught by me in a garden in Charleston, S. C., June 29, 1897, in company with a large series of normal specimens of the same species and its peculiarities were not noticed until it was afterwards expanded. On the under side of the hind wings the silver-white spot, large in the normal form, is reduced to a mere dash along the base of the cell, and an isolated faint mark at right angles to and touching sub-costal vein opposite base of cell.

Eastern Eupithecias.

By Richard F. Pearsall.

Eupithecia catskillata n. sp.

Expanse 16-17 mm. Palpi long, rather heavy, dark brown, the tips white. Antennae silvery, annulate with pale brown, shortly ciliate in ♂. Vertex and front with dark brown and gray scales mixed.

Thorax with band of dark brown crossing it in front centrally by a narrow pure white band not always present; the scutellar region tipped with a conspicuous spot of white scales. Fore wings broad, well rounded, pale gray tinged with yellow brown. A dark area at base, crossed by a series of faint lines a little darker, is limited by a double pale line which leaves costa above discal spot, sweeps outward in a bold curve quite around and touching it, and in another broad outward curve reaches inner margin one-half out. This line is broader and clearer than the extra discal pale line which is also present, and, angled outward below costa, runs parallel with it, rather nearer the margin than usual. Between them a dusky shade line, is marked with short dashes on veins. The subterminal white line very obscure and narrow, except at anal angle where it forms a broad lunule curved inward. Discal dots oval, distinct, black. Below discal dot, at end of cell, is a small patch of yellow scales present in all of my examples. Subterminal space dark like basal area, frosted costally at apex with white. Marginal line usually entire, black. Fringes long pale gray with

darker patches at end of veins, on all wings. Hind wings rounded, paler subcostally, otherwise the same arrangement of lines as on fore wings but without darker basal area, and much more obscure. Discal dot small, faint. Beneath grayish white. The double series of pale lines as above, very apparent, almost pure white, and the separating dusky lines diffuse. Basal line on hind wings rounded, entire, an intra discal runs outward to discal dot, though not always touching it, turns backward to inner margin at almost a right angle, and extra discal with outward curve around discal dot, reaches inner margin one-half out. A diffuse, dusky shade line, subterminally. Abdomen beneath and legs pale silvery gray.

Type ♂ and ♀ taken in Big Indian Valley, Catskill Mountains, the former May 25th, '06, the latter May 31, '06, in my collection.

Co-types 24 ♂ and ♀ taken in same locality May 25 to June 12. Readily determined by the patch of yellow scales on fore wings beneath discal dot on fore wings, and the snow white scutellar area. Near to *fletcherata Taylor,* but smaller.

Eupithecia erpata n. sp.

Expanse 17-18 mm. Palpi long dark brown, mixed gray scales. Vertex and front dark brownish ash. Thorax and abdomen above, dark wood brown with a few pale scales intermixed, the second segment entirely soiled white, the sixth and seventh, with black dots laterally; tufts, small, black, all wings somewhat extended, above dark ashen brown faintly tinged with yellowish, the latter more apparent on fore wings, at junction of veins three and four, and subterminally, especially toward apex. Over all is a thin sprinkling of black scales, heaviest along costa and subterminally. Basal area to discal line is crossed by wavy indefinite lines, of darker hue. The black discal line curves sharply outward at costa, then recedes toward base, touching inner margin, one-third out. It is faint and narrow, bordered by a pale gray line. The intradiscal, also faint, starts from costa, with an ill-defined cloud above discal dot, extends outward to include same, and thence straight to inner margin. In rubbed examples this line is frequently wanting, with the discal space paler and clear. The extra discal with its succeeding double pale lines, are sharp and distinct, the former black, more intense centrally, where also a few white scales border it outwardly. It curves gently outward around cell, without angle at costa, to inner margin, having sharp inward spurs on veins one and two. Subterminal space darker; the central clear white line runs in waves parallel to the double lines, and ends near anal angle in a larger angular white patch. Marginal line black nearly

entire. Fringes long dusky, cut sharply with dark brown at ends of veins.

Hind wings paler costally, the cross lines fading out except the discal and extra discal, both crossing the wing in regular curves, to inner margin, the latter and its succeeding pale lines, well marked. Subterminal space darker, narrow, traversed centrally, as in fore wings, with a clear white waved line. Fringes as on fore wings. Discal dots on all wings small black, wanting in some examples. Beneath, pale ash gray, the lines above distinctly reproduced, especially the extra discal, and a subterminal shade line which are black at costa on fore wings. Discal spots linear, black, very distinct. Hind wings with cross lines diffuse, the discal boldly angled outward at cell turns sharply backward to inner margin, intradiscal rounded to discal spot which it includes, thence parallel with discal line to margin, extra discal starting from costa with strong outward curve encircles discal spot thence straight to inner margin, and subterminal, parallel with margin, these latter as in fore wings most distinct; discal dots round, black, prominent. Body beneath and legs pale ashen.

Type ♂ and ♀ taken in Big Indian Valley, Catskill Mountains, the former, May 5, '07, the latter April 29, '07, together with 18 co-types in both sexes in my collection.

I have received this species from Mr. F. A. Merrick, New Brighton, Pennsylvania and from Massachusetts. It resembles *palpata* but is smaller. From that species it differs in having the pale line near base of abdomen and its tip beneath not dark. Its striking features are prominence of the extra discal and pale lines above on all wings, and by the short inner margin of hind wings which causes the lines to run from it almost laterally for half their length, the anal angle being nearly obliterated.

After a long period of obscurity *Eup. coagulata* Guen. has been separated from *geminata* Pack., but there still remain under the latter name two distinct species, not difficult of separation with good series of specimens. To which belong the name of *geminata?* In Dr. Packard's original description (5th Report Peab. Acady., page 58) he notes, one special feature—*the large discal dots on all wings*—which serves to fix the application of his name to the larger species—with its expanse of 25 mm. and over. The smaller spe-

cies I describe herewith, having before me a series of eleven in both sexes, under the name of

Eupithecia meritata n. sp.

Expanse 20-22 mm. Head, thorax, body, except second segment of abdomen, which is black, and wings above, a uniform dark cinerous, crossed by fine black lines, or rows of dots on veins. These lines enlarged at costa, the two largest just preceding and beyond the discal dot. The basal line at costa bends sharply outward, then retreats toward base at inner margin. The discal line, with a short outward angle at costa, runs straight across wing. Extra discal is a series of dots on veins, rounded out from costa to below cell, thence direct to inner margin. Midway between these a fine black distinct line starts from costa, rounds out sharply to enclose discal dot, below which it runs straight to inner margin, sometimes wavy. Subterminal clear space, beyond the narrow pale line following extra discal, and parallel to it, is traversed centrally by a fine whitish crenulate line, a little clearer at anal angle. Centrally the veins are marked quite freely with black dashes. Fringes long, cinerous, darkened at ends of veins. Fine terminal line black. Abdomen, with scattering brownish scales, tufts small, black; below somewhat darker. Body and legs pale cinerous. Comparison with *geminata Pack.* might be useful and descriptive. It may be separated thus: Beside its smaller size which is quite constant, the upper surface is darker, more distinctly marked with black fine lines, or sharply dotted. The white line in submarginal space is clear and continuous, and the discal dots large oval, jet black on forewings, are entirely wanting on hindwings, or very faint and small; while in *geminata*, the discal dots on *all* wings are large and very prominent. Beneath, the surface is crossed by well-defined bands, a little diffuse in some examples, the extra discal on both wings and the pale line beyond it particularly clear. The white submarginal line reappears below quite plainly and the discal dots if present are fainter—while in *geminata* the under surface is clear silvery cinerous, the pale line beyond extra discal only showing by contrast with dusky shade preceding and subterminally, the latter not traversed by white line, and the discal dots large, distinct on all wings.

Type, ♂ and ♀ from Big Indian Valley, Catskill Mountains, July 6 and 16, 1899, in my collection. Co-types from Mr. F. A. Merrick, New Brighton, Pa., taken in August, 1907, represented in the Merrick Museum, and in my collection.

NOTE—In March issue Ent. News, the date of capture of ♀ type of *Eup. conformata* should read April 23, 1904, and of the types of *filmata* April 29, 1907.

Packard's Eupithecias.

By L. W. Swett.

Eupithecia palpata.

This species has been discussed by Rev. G. W. Taylor and Mr. J. Grossbeck in the Entomological News and Canadian Entomologist. About two years ago my esteemed friend, Dr. Russel of Winchendon, Mass., sent me about twenty-five of this species and I took them to Cambridge to compare with the type of *Eupithecia luteata* under which name Packard listed it as a synonym. The type of *luteata* was there with the correct label, a male in poor condition, also *palpata* ♂ Brunswick, Maine, but no other type specimens. I found that *palpata* had longer palpi than *luteata* but was rubbed so that I didn't want to be positive. I communicated with Dr. Taylor and Mr. Grossbeck and told them what I found. Shortly afterwards I received a specimen of *palpata* labelled *ornata* Hulst, from Dr. Taylor with the locality Penn., but agreeing with my specimens except that the fringe was slightly darker. A little while after, I received a second letter from Dr. Taylor saying that he agreed with me as to *palpata* and that Hulst had identified incorrectly that species as his *ornata* which was not like the true *ornata* Hulst. So matters began to clear and Dr. Taylor and Mr. Grossbeck were entirely correct in their articles, though I am afraid I influenced them somewhat by being unwilling to separate the two at first, even though it was I who first noted the structural differences. On my last trip to Albany I found the remaining types of *Eupithecia palpata* male and female agreeing with the Maine type at Cambridge but much larger. The Albany types bear the label *Eupithecia palpata* and below *E. luteata,* showing that Packard was uncertain of his species. Now being sure that I had *palpata* correct as I knew all the types I went to Cambridge and made minute comparisons. *Eup. luteata* is badly rubbed but can be separated from *palpata* as follows: palpi of *luteata* short, scarcely beyond head, extra discal line angulated below costa the median portion is rubbed but I believe a line must have run through discal spot once, for on the inner

margin directly beneath discal mark is a prominent black dash. *Eup. palpata* has long palpi, extra discal line always rounded below costa never angulated in the series of 60 specimens which I have compared and lacks the black line on inner margin and is only two-thirds as large as *luteata*. Now that we know all the types which we did not before and found *luteata* labels in Packard's handwriting on *palpata* types at Albany, I think we have good grounds for knowing that Packard confused the two species and that they should be listed as separate species. This in no way effects the previous excellent articles by Mr. Grossbeck and Dr. Taylor but confirms their statements and settles the standing of *palpata* by finding the missing types at Albany. It is strange the older authors did not know this species as it seems to be very common, extending from northern Maine to Pennsylvania and is not variable.

Texas, Virginia and Maryland notes on the Catalpa Sphinx, Ceratomia catalpae Boisduval.

By A. Arsene Girault.

The caterpillars of this species were very abundant and injurious in 1904 to catalpa trees (*Catalpa* species) lining some of the streets of the city of Paris, Texas. On certain streets they became so abundant as to be very annoying to pedestrians. During the season of 1904, I made tentative observations on the insect and these form more or less of an outline of the seasonal history of the species for that locality. Some additional notes are also submitted from southwest Virginia, and Annapolis, Maryland.

At Paris, Texas, on the 28th of June, 1904, it was noted that injury to the catalpa trees was noticeable and that the frass from the caterpillars made a noise like dropping rain. On the 13th of August, the caterpillars were so numerous on a row of catalpa trees on one side of east Lamar Avenue, that their frass covered the sidewalks beneath the infested trees for several blocks, and the continual dropping of it sounded very much like rain pattering on dead leaves in a forest; at this time, the pattering noise was much more noticeable than in

late June. Besides, many of the large caterpillars, and those that were parasitized, were wandering over the pavements or crawling on fences and so forth, and by their presence added more or less to the general annoyance. On that date many of the trees were completely stripped of foliage, while others bore large bare patches, entirely destroying their appearance.

On September 23, 1904, the following note was made concerning this insect: "Nearly every catalpa tree in this vicinity was defoliated at some period during the present summer by these larvae; especially those on Lamar Avenue where the sidewalk was coated with pellets of frass for several months (August, September). Some of these trees put on as many as three sets of leaves during the season, while nearly all were stripped once and put out a second set. If this was repeated every season, the drain on the vitality of the trees would soon kill them."

According to notes the insect first made its appearance late in April. On May 7th, it was recorded that the larvae of the first generation were in instars II and III, and that these were pupating about May 21. The larvae of the second generation were present in different instars on June 20th. On July 1st, eggs were found, and larvae were pupating in numbers on July 3d, so that the generations soon afterwards became considerably mixed, and the notes failed to record anything more definite than that the third generation of caterpillars was present in July. The moths were then common. Another lapse then occurs in the notes, but on September 23d, it was recorded that a fourth generation of larvae was present many of which were nearly full grown. I am uncertain whether this was a fourth or fifth generation. It was noted that at that time the generation was much decreased in numbers, not as large, for instance, as the third generation. These notes indicate at least four generations of the species in northeastern Texas. The duration of the pupal instar in July was from about 10 to 12 days.

The caterpillars were much attacked by tachina flies, but none of the flies were reared. On August 17th, 211 specimens

of the braconid parasite *Apanteles congregatus* Say (Detr. J. C. Crawford) were reared from a nearly full grown larva found several days previously, bearing the usual white cocoons on its body. No hyperparasites were present in this case.

At Blacksburg, Virginia an egg-mass of this species was collected on May 26, 1902 on the under surface of a leaf. These hatched on the morning of June 4th, or 9 days later. The top layer of eggs hatched first, and the egg-shells were not eaten by the larvae. The vacated egg-shells were of a dull heliotrope color. On June 7th at 3 P. M., some of the caterpillars began to pass through the first ecdysis, and this was completed on the 8th. On June 11th the second ecdysis occurred, and on the 14th the third. Unfortunately on the 16th, all of the larvae died from the effects of eating poisoned leaves accidentally given to them. A single cocoon of an ichneumon parasite was found attached along the petiole of one of the leaves introduced into the cage for food. This was found on June 20th, and was elliptical, oval, gray, with two interrupted dark bands, one near each end, irregular spots of the same color on each end, and about a quarter of an inch long; it was apparently the cocoon of a species of *Amorphota* Förster, or an allied genus in the Campoplegini. Near this cocoon the withered remains of a *catalpae* larva was found; a large hole was present on one side of the thorax near the head. These facts are mentioned because I believe there are no recorded primary parasites of the catalpa sphinx in the family Ichneumonidae.

A year previously, on July 8th, 1901, I twice observed a heteropteron sucking the juices from the body of young caterpillars, but have no note indicating what species it was.

At Annapolis, Maryland, the larvae were noticeably abundant July 29th, 1899, and present in various instars as late as October 10th, the same year. On June 30th, 1900 in the same locality in regard to a group of catalpa trees on the suburbs of the city, it was noted that some of them were completely stripped of their foliage, presenting a very desolate appearance. The caterpillars were also present in numbers near Annapolis in the month of September, 1901 and 1902.

New species of the Tipulid genus Rhypholophus, with a Table for Determining the North American species.

R. W. Doane, Stanford University.

1. Discal cell closed, or coalescing with the second posterior cell . . 2.
   Discal cell open, coalescing with the third posterior cell . . . . . 11.
2. Wings variegated with gray or brown markings. . . . . 3.
   Wings uniformly colored . . . . . 5.
3. Sixth and seventh longitudinal veins divergent, wings spotted with brown in all the cells . . . . . **innocens** O. S.
   Sixth and seventh longitudinal veins parallel or converging toward the tip . . . . . 4.
4. A narrow, indefinite, sometimes almost obsolete brown band running from the stigma across the central cross-veins.
   fascipennis Zett.
   Three more or less definite brownish or grayish bands across the apical portion and three spots in the basal portion of the wing.
   nubilus O. S.
5. Seventh vein arcuated in such a way that the axillary cell is as wide or wider in the middle than at the tip . . . . . 6.
   Sixth and seventh veins divergent at the tip . . . . . 8.
6. Discal cell open, coalescing with the second posterior cell.
   holotrichus O. S.
   Discal cell closed . . . . . 7.
7. Antennæ altogether brownish . . . . . **arcuatus** n. sp.
   First and second segments of the antennæ yellow . . **fumatus** Doane.
8. Antennæ altogether brownish . . . . . **divexus** n. sp.
   Antennæ yellow at the base . . . . . 9.
9. Discal cell open, coalescing with the second posterior cell.
   flaveolus Coq.
   Discal cell closed . . . . . 10.
10. First four segments of antennæ yellow . . . . . **nigripilis** O. S.
    First two segments of antennæ yellow . . . . . **fusiformis** Doane.
11. Thorax reddish, with a distinct black line in the middle.
    rubellus O. S.
    Thorax brownish or yellowish . . . . . 12.
12. Wings with a conspicuous stigmatal spot . . . . . 13.
    Stigmatal spot not conspicuous . . . . . 15.
13. First two segments of antennæ yellowish . . . . **lanuginosus** Doane.
    Antennæ wholly brownish . . . . . 14.
14. Claw at the tip of the lobes of the hypopygium simple, with a single straight branch at the base . . . . . **meigenii** O. S.
    Claw at the tip of the lobes of the hypopygium complex, base very broad and emitting three short curved branches. . **cornutus** n. s.

15. Thorax light yellow . . . . . 16.
Thorax brownish or brownish-yellow . . . . . 17.
16. Antennæ and palpi, except basal joint, brown . . . . **cockerelli** Coq.
Antennæ wholly yellow . . . . . **parallelus** n. sp.
17. Antennæ of male long, reaching beyond the root of the wings . . 18.
Antenna of male not reaching beyond root of wings. **manicatus** Doane.
18. Antennæ of male longer than the whole body . . . **longicornus** n. sp.
Antennæ not longer than the whole body . . . . . 19.
19. Thorax with three brown stripes . . . . . **affinis** Lund.
Thorax without stripes . . . . . **monticola** O. S.

Rhypholophus arcuatus n. sp.

Brown; head grayish brown, front darker; rostrum, palpi and antennae brown, the latter somewhat lighter toward the base; thorax brown with a grayish bloom, with rather long yellow hairs; scutellum and metanotum hoary; halteres pale, knobs slightly darker; legs light brown, tarsi darker; abdomen brown with rather dense light yellow hair; ovipositor long, ferrugineous, upper valves strongly arcuated; wings brown, pubescence rather dense of medium length; stigma slightly darker; veins darker brown; auxiliary cross vein about half way between the origin of the praefurca and the tip of the auxiliary vein; discal cell closed, seventh vein arcuated in such a way that the axillary cell is broader in the middle than at the tip. Length 6 mm., wing 8 mm.

Hab.—Ithaca, N. Y. Two females.

Rhypholophus divexus n. sp.

Brown; palpi and first joint of antennae dark brown, other segments of antennae very light brown; thorax wholly light yellowish-brown; legs brown; femora, except at the base, much darker; abdomen brown; with dense rather long brownish-yellow hairs; ovipositor ferrugineous, upper valves strongly arcuated; wings brown; stigma darker brown, distinct; pubescence rather long and dense; discal cell opening into the second posterior cell; sixth and seventh veins diverging. Length 4 mm., wing 6 mm.

Hab.—Keyport, Wash. One female.

Rhypholophus longicornus n. sp.

Brown; palpi and antennae brown, elongate the latter in the male as long as the whole body; joints of the flagellum somewhat fusiform with a dense whirl of long fine light-brown hairs; thorax brownish yellow, slightly darker above; halteres yellowish brown, tips of knobs darker brown; legs light brown; abdomen brown with rather dense long light-yellowish hairs; hypopygium yellow, lobes somewhat elongate, claws reddish-brown darker at the tips; ovipositor ferrugineous, long, slender, upper valves conspicuously arcuated; wings rather broad,

brown, stigma and the costal cell somewhat darker; pubescence long and dense over the whole wing; discal cell opening into the third posterior cell; distal portion of the sixth and seventh veins subparallel. Length 4 mm., wing 6 mm.

Hab.—Keyport, Wash. Two males, two females.

Rhypholophus parallelus n. sp.

Yellow; front and palpi somewhat darker; antennae wholly yellow; thorax reddish yellow, slightly darker above; halteres pale yellow; knobs slightly infuscated at the tip; legs yellowish; abdomen brownish above, yellow below; ovipositor reddish-yellow, upper valves somewhat arcuated; wings brown, rather narrow; stigma indistinct; discal cell opening into the third posterior cell; distal portion of the sixth and seventh veins subparallel, the latter slightly arcuated; pubescence on the wings rather long and dense. Length 5 mm., wing 6 mm.

Hab.—Ithaca, N. Y. Two females.

Rhypholophus cornutus n. sp.

Yellowish-brown; rostrum and palpi darker brown; antennae light brown, joints of the flagellum of the male with a dense soft pubescence and long verticles, those of the female with the pubescence less dense; thorax yellowish-brown with sparse reddish-yellow hairs; halteres yellowish; legs brownish, femora lighter toward the base; abdomen brown, with long sparse yellow hairs; hypopygium reddish-brown, horny appendages black, those at the tip of the lobes very broad and emitting three short curved branches; ovipositor reddish-yellow, upper valves slightly arcuated; wings brown; stigma darker brown; pubescence on wings not very long or dense; discal cell opening into the third posterior cell; distal portions of the sixth and seventh veins subparallel. Length 5 mm., wing 6 mm.

Hab.—Stanford University, Cal. Two males, one female.

Evelyn Groesbeeck Mitchell has brought suit against Dr. Harrison G. Dyar to recover $35,000 damages on account of a review of her book on mosquitoes which he published in the Canadian Entomologist.

Note on *Perilitus americanus* Riley.—At Paris, Texas, adults of *Megilla maculata* DeGeer were quite commonly found during the second week in July, 1904, and later, adhering to the cocoons of this species, its parasite, in corn fields. Many of these cocoons were brought into the laboratory and the resulting parasites proved to be all females, which varied considerably in size. The cocoons of the parasite were still numerous in August at Paris and were also found at Will's Point, Texas, on August 15th. The pupal instar was recorded in two cases, beginning with the formation of the cocoon: July 16-22, 5½ days, and July 18-23, 5 days.—A. A. Girault, Paris, Texas.

A new genus and species of Neuroptera.

By Nathan Banks.

Recently Dr. J. B. Smith in sending some New Jersey material, included a few forms from California. Among the latter is a specimen of a Hemerobiid belonging to a new genus and species. As I have lately revised our species of this family it is with much interest that I add this striking form to our fauna.

OLIARCES n. gen.

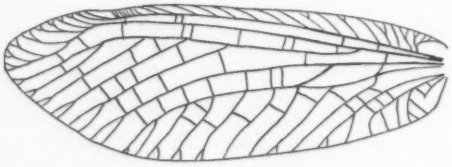
Body thick and heavy as in *Polystoechotes,* head rather small, no ocelli; antennae broken, scarcely the diameter of basal segment apart, and closer to the small eyes; pronotum about three times as broad as long, a little broader behind than in front, abdomen rather short and stout. Legs slender, tibial spurs distinct, no spines, but many hairs and bristles, apical tarsal joint as long as basal, others much shorter. Wings moderately slender; in the fore wings the radius and sub-costa do not unite near tip, although they come very close together; beyond the stigmal region the radius is bent downward and emits several forked branches from its upper side to the margin of wing; the lower branch of the median vein, soon after its origin, unites with the cubital; the latter gives off a number of branches to the margin; cross-veins quite numerous, but not in series; at costal base is a recurrent vein; the radial sector arises near base of wing, but has only four branches; the costal cross-veins are outwardly oblique. The hind wings are veined much like the fore pair, but the lower branch of the medius does not run into the cubital vein, but parallel to it, and soon forks; cross-veins hardly as numerous as in the fore pair; and radial sector with five branches.

In many respects this is similar to *Polystoechotes,* but differs at once by the subcosta not joining the radius, by the much fewer branches of the radial sector, irregular cross-veins, and in forewings by the union of lower branch of median vein to the cubital.

Oliarces clara n. sp.

Head and body dark brown, mouth and antennae paler; pronotum clothed with long dark hair; legs dull yellowish, very hairy; abdomen

pale brown beneath, darker above, very hairy, the apical joints beneath are flattened, and the last has a broad basal concave scar, this last segment in the male (at least), is about twice as broad as long, with nearly



Forewing *Oliarces clara* Banks.

parallel sides, and at each side shortly before tip is a very large, stout appendage; with a broadly rounded, incurved tip, all very hairy. Wings hyaline, venation whitish, the radius at extreme base is fuscous. Expanse 35 mm.

One specimen from Walter's Station, Calif., April; kindly sent me by Prof. J. B. Smith.

The Life History of Euchloe ausonides Boisd.

KARL R. COOLIDGE AND EWAL J. NEWCOMER.

Euchloe ausonides was first described by Boisduval in 1852, in the Annales de la Société Entomologique de France. Since then it has been described and figured by Edwards, Mead, Holland, Wright, and others. It is closely allied to the European *ausonia,* and we believe the two forms will prove identical. Beutenmüller writes*, "The European species is double brooded, and as far as I can learn the larva is also different from our species." As with other North American forms of *Euchloe, ausonides* has usually been considered monogoneutic,† but in several cases which we observed last year, imagines have emerged in the early summer instead of hibernating in the chrysalis, thus indicating the representatives of a second brood.

Edwards‡ says of *ausonides*: "*Ausonides,* as remarked by

*Bull. Am. Mus. Nat. Hist. p. 240, 1898.

†W. H. Edwards (Can. Ent., XXIV, 109) writes: "I am told that some collectors think that *A. hyantis* is the spring form of *ausonides.* If so, it is a mistake. There is but one annual brood of *ausonides.* In different years I have had four examples come from bred pupae; all in the month of March; all typical *ausonides.*"

‡Butt. N. Am. V. 2, 1874.

Dr. Boisduval, is scarcely distinguishable from *ausonia* Hbn., a species found in the regions bordering the Mediterranean, and subject to much variation, especially in the degree of mottling of the underside of the secondaries.

The alpine variety *simplonia* Freyer, seems nearest the usual American type, though we have also individuals in which the markings approach *belia* Esper., considered to be another variety of *ausonia*.

A comparison of the larvae and the chrysalids would best determine the relationship, but I have been unable to find a description of these stages of *ausonia*. It is to be noticed that where a species becomes widely dispersed and sections are separated by impassable barriers, the larvae are often first to differ, and may become quite distinct before any wide difference is observed in the imago."

As in all our species of *Euchloe, ausonides* exhibits considerable variation especially in size and the density of coloration. In the male the ground color is sometimes pure white, but may be more or less yellow-tinted. The female frequently has the upper surface of the secondaries suffused with a buff or ochraceous tint and the dark green marbling of the inferior surface of the secondaries varies somewhat in density in both sexes. The discal spot also varies considerably; sometimes it is reniform, or lunate, or in the form of a sinuous bar, of variable breadth. As a rule, western specimens are much larger than eastern. We do not consider the variety *hyantis* Hy. Edw., as placed by Dyar and Skinner, a variety of *ausonides*. It is not the summer brood as we have compared our specimens with descriptions of *hyantis* and find them abundantly distinct. Specimens of the summer brood closely resemble those of the typical form, except in being more yellow-tinted. The form *coloradensis* Hy. Edw., may be known by its deeper green tint on the underside of the secondaries, and the discal bar of the primaries above is in the form of a small, black, lunate dash. It is recorded from Montana, Colorado and California. We have not noticed it in this locality. As shown by good series, it intervaries to *ausonides* and can hardly be considered worthy of varietal rank. It would be interesting to compare our varieties of *ausonides* with those of *ausonia*. Although *ausonides* has a wide distribution, ranging west of the Rocky Mountains from Arizona to Alaska, it appears to be rather local, but is quite common when found. In the Santa Clara Valley, it is a common and early butterfly, flying about the flowers of *Brassica, Radix* and other cruciferous plants. It usually appears about the end of February,

sometimes earlier and is on the wing until June and the earlier part of July. This varies, of course, according to the locality. In Colorado it appears in May and June, and in Montana we have taken newly emerged specimens as late as July. In the high Sierras it flies until the end of July.

The flight of *ausonides* is much similar to that of congeneric species. It flies but a few feet above the ground, in a somewhat zigzag, aimless course, alighting only on flowers. It was probably for this reason that the name *Anthocharis** was given to the genus by Boisduval. When alarmed, however, its erratic flight makes capture difficult. Little has ever been written of the preparatory stages of *ausonides*. Mead found the eggs and larvæ in Colorado and Edwards† has figured the egg, larva and pupa and described the mature larva and pupa. Beutenmüller has briefly compiled a description of the larva and chrysalis and Hy. Edwards, in the Proc. Cal, Acad. Science, v. 5, p. 326, describes the larva from Mead in litt.

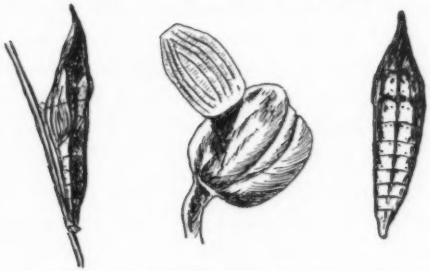
In a letter to W. H. Edwards, Mead writes: "At Turkey Creek Junction there were many eggs and some larvae to be found, the latter feeding on the flowers and seed vessels of a cruciferous plant. The eggs were long, ribbed longitudinally, and in color light yellow. The larvae are solitary, and are seen stretched at length on the stem or seed-pods of the plant." The transitional stages of the larva have never been described. At first, we had some difficulty in finding the eggs but a little experience made it easy. The egg-laying habits are much similar to those of allied species and agree well with *olympia*, the life-history of which was recently described by Shull‡. Our first record of oviposition is March 14, but this is perhaps a little earlier than usually occurs. The eggs are mostly placed on the *sepals* of the young inner buds of the plant and also quite commonly on various parts of the *pedicel*, especially on the *rachis*. In a few cases we have observed the female ovipositing on the leaves. The illustration shows the normal position. We have never seen a female lay more than one

* Ανθος (anthos), a flower, and Χαίρειν (chairein), to delight in.

†Butt. N. Am. Vol. II, pl. 2.

‡Ent. News, Vol. XVIII, 1907.

egg in a flower cluster, although occasionally she will deposit several on the same plant. However, as many as six or seven have been found in a single cluster, but these must have been laid by different females or by the same female at different times. We concur with Prof. Shull in saying that the egg-shell



is not eaten. He says, "my observations on this point are at variance with the statement commonly made that butterfly larvae devour the shell from which they emerge before beginning to feed upon the food plant."

There are a large number of species, the young larvae of which do not eat the egg shell. In the case of *Pyrgus tessellata,* eggs of which we have found abundantly on *Malva borealis,* a small circular hole was the only evidence that the larva had escaped, the empty shell remaining firm and intact.

The young larvae of *ausonides* escape by eating away a portion of one side of the egg shell. Their first vegetable food consists of the young and tender sepals and petals or very rarely the leaves of their food plant. As they mature and after the flowers have disappeared they feed on the seed pods. In captivity, the mature larvae are inclined to be larvaphagous and will readily devour each other when opportunity offers. There is a striking resemblance between the larva of *ausonides* and that of several species of *Pontia,* particularly *protodice,* "more alike," writes Edwards, "in color, form, and markings than often happens between species of the same genus." There is no pupal resemblance whatsoever. As a rule, the duration of the instars we have found to be fairly regular but may vary considerably according to the condition of the weather.

The following is a record of ten cases which we observed.

	TIME IN DAYS					
	1st Instar	2nd	3rd	4th	To Girdle	To Pupa
1	8	4	3	4	6	2
2	6	3	3	3	6	2
3	7	3	3	5	6	1½
4	5	3	3	4	4	1½
5	5	3	3	4	7	1½
6	6	4	3			
7	9	5	12			
8	5	3	3	3	8	1½
9	6	2	5	2		
10	6	4	9			
Av.	$6\frac{3}{10}$	$3\frac{2}{3}$	$4\frac{7}{10}$	$3\frac{1}{7}$	$6\frac{1}{8}$	$1\frac{2}{3}$

We wish here to thank Prof. Chas. A. Shull for his kindness in copying for us the anthocharid text from Edward's work and Miss Julia Wright for her excellent illustrations.

Egg.—Fusiform, laterally marked with about sixteen raised vertical ridges, between which are finer cross veins; nearly 1 mm. in length. Color when first laid light bluish-green changing in 24 to 30 hours to light orange. By the third day the color is almost vermilion and about the sixth the egg turns dirty yellow-brown, especially so apically. The

duration of the egg stage is about seven days, varying according to the season.

First Instar.—Length, a little over 1 mm. Color, orange-yellow, becoming lighter in a day or two; head almost black; body sparsely covered with dark colored hairs.

Second Instar.—Length about 4 mm. Color, light greenish, soon turning dark; head black.

Third Instar.—Length, 5.5 mm. The markings can now be plainly seen; the dorsal stripe is bluish or grayish green; on each side of this is a subdorsal yellowish green stripe, then a lateral grayish green stripe, and finally an infralateral yellowish line; ventral surface greenish; head greenish almost black; numerous black tubercles scattered over the body.

Fourth Instar.—Length, 17 mm.; maculations more sharply defined than before; head rather light greenish-gray sprinkled over with black tubercles from which protrude short bristles.

Fifth Instar.—Length in motion 33 mm.; at rest 28 mm. Cylindrical, slender; head rounded, small. Colors much brighter; ground color dark green; upper half of infralateral line white, lower half yellow; head green speckled with black; thoracic legs black, abdominal ones greenish-yellow.

The larva, when full grown, loses its bright colors and soon spins the silken buttons and girdle from which it is to hang, The former colors are replaced anteriorly and on the line of the spiracles by a purplish tinge. After the girdle is completed, the larva remains quiet for from 36 to 40 hours, when pupation takes place. It will not be necessary to give at length this operation, as it has already been described in the case of a closely allied species (*olympia*) and is also much similar to that of *Pontia rapae* and others of that genus.

Chrysalis.—Average length 26 mm. Cylindrical, slender, thickest in middle and tapering therefrom evenly, the ends being nearly equal size. At first the chrysalis has the same general purplish tinge of the larva and the dorsal side shows the same markings. The wing-cases and projection of head are almost transparent. These, especially the latter, soon turn dark. Final color, anterior portion dark brown, continuing on the ventral side to the tips of the antennæ, which are light, and on the dorsal side only to a point opposite the eyes; wing veins marked in brown; dorsal side of thorax and abdomen light yellow or cream color; ventral side light brown. There are five well-defined lines on the pupa; a dorsal one, dark brown, running the full length of the body

except for the last two posterior segments; two laterals, also dark brown, running the full length of the abdomen and shaded into the other markings of the thorax; two lying about midway between the lateral and ventral lines, light brown and continuing only to the wing-cases. The ventral line is very slightly marked.

Considerable variation is shown in the color of the markings and also in the degree of re-curvature of the palpi-cases.

Contarinia gossypii n. sp.

By E. P. Felt, Albany, N. Y.

This species is injurious to cotton in the British West Indies, and was received from Mr. Henry A. Ballou, Entomologist to the Imperial Department of Agriculture, Barbadoes, through Dr. L. O. Howard, at whose request it is described:

Male.—Length 1 mm. Antennae about twice the length of the body, thickly haired, light brown, 14 segments; the first broadly obconic, the second flattened basally, subhemispheric; the others binodose, the third and fourth slightly fused, the fifth having the basal portion of the stem with a length three times its diameter, the distal part with a length four times its diameter; the enlargements with the membrane thickly dotted with chitinous points; the basal one subglobose, flattened basally, with a sub-basal whorl of long, stout setae and a subapical circumfilum; the loops of the latter long and extending to the middle of the distal enlargement, which latter is slightly produced, broadly oval, with a thick whorl of long, stout, curved setae near the middle and a subapical circumfilum, the loops of the latter distinct and extending to the middle of the basal enlargement of the following segment; terminal segment with the basal enlargement subglobose, the basal portion of the stem somewhat produced, slender; the distal enlargement slightly produced and bearing apically a long slender finger-like process. Palpi quadriarticulate; the first segment apparently short, stout, irregularly subquadrate; the second a little longer, broadly ovate; the third fully half longer than the second, more slender; the fourth as long as the third, more slender, all rather thickly clothed with coarse setae. Face fuscous, yellowish, eyes large, black; mesonotum dark brown, the submedian lines yellowish; scutellum fuscous yellowish; postscutellum yellowish; abdomen greenish yellowish, the segments posteriorly rather thickly margined with coarse setae; wings hyaline, costa pale straw; subcosta uniting with the anterior margin near the basal third, the third vein

just beyond the apex, the fifth joining the posterior margin at the distal fourth, its branch near the basal third; membrane sparsely clothed with fine hairs. Halteres presumably yellowish transparent, coxae yellowish, femora and tibiae pale yellowish straw, tarsi slightly darker. Claws long, slender, evenly curved, simple, the pulvilli a little shorter than the claws. Genitalia; basal clasp segment rather long, broad, tapering to a narrowly rounded apex; terminal clasp segment long and tapering slightly to an obtusely rounded apex. Dorsal plate and other minor organs indistinct in the preparation.

Female.—Length 1.5 mm. Antennae about as long as the body, sparsely haired, pale yellowish, 14 segments; the first broadly obconic, the second somewhat produced, broadly fusiform, the others cylindric, the third and fourth slightly fused; the fifth with a stem about 1-5 the length of the subcylindric basal enlargement, which latter has a length nearly 2½ times its diameter, the membrane thickly dotted with chitinous points, with a thick sub-basal whorl of long, stout, curved setae, and a scattering subapical band of shorter curved setae; low circumfili occur near the basal third and apically; terminal segment strongly produced, the distal enlargement with a length about four times its diameter and distally tapering to a narrowly rounded apex. Palpi quadriarticulate; the first segment irregularly fusiform; the second narrowly oval and half longer than the first; the third half longer than the second, more slender; all rather thickly clothed with coarse setae. Colorational characters about as in the opposite sex, except that the abdomen appears to be a fuscous greenish yellow and the posterior margins of the segments, especially the apical ones, are more thickly clothed with coarse setae; tarsal characters as in the opposite sex. Ovipositor yellowish, probably nearly as long as the body when extended, the terminal lobes very long, slender, having a length fully five times the width and tapering to a subacute apex bearing a few short, stout setae subapically.

Described from a number of specimens recently mounted in balsam.

Types, C. 1331, deposited in the U. S. National Museum and New York State Museum.

PHENACOCCUS GOSSYPII.—Some time ago Prof. C. F. Baker sent me this species on *Jacobinia coccinea,* from Santiago de las Vegas, Cuba. Both locality and food-plant are new.—T. D. A. COCKERELL.

MR. HERMANN ROLLE, of Berlin, Germany, has published a number of lists and price catalogues of Lepidoptera and Coleoptera. These will be found useful to both the collector and the systematic worker.

The Blackberry Leaf-Miner.

(Scolioneura capitalis Norton.)

By C. O. Houghton, Newark, Del. Entomologist, Delaware Experiment Station.

About the middle of June, 1905, my attention was called to an injury, said to be quite serious, to dewberries on a farm near Dover, Delaware. My first visit to the place was on June 16th, at which time I found a field of about four acres considerably injured by a leaf-miner. Upon some of the plants dozens of leaves showed large, brownish blotches, and not a few of them contained two or three mines; the majority of the leaves, however, had but one. The patch was upon comparatively new ground, but was at some distance from woods. Other berry fields at some distance from this one (three or four miles) were said to be attacked in the same manner, but I did not see any of these. The owner of the field in question stated that this was the first occurrence of the pest in his fields.

Several of the leaves containing mines were collected and brought home for study. An examination of the larvae showed that they were apparently saw-fly larvae, but at that time I was unable to place them satisfactorily. An attempt was made to rear them by placing the leaves in jars containing earth, but apparently all of the larvae died without entering the earth; at least several which emerged from their mines were later found dead on top of the earth in the jars.

On June 28th, 1905, I again visited the infested field, but found only a very few leaves upon the plants which contained larvae. Evidently they had practically all pupated at that date. An attempt was made to locate some of the pupae in the ground near the bases of some of the infested plants, but without result.

On July 11th I left Newark for a month's vacation, and upon my return early in August learned that a second brood of the leaf-miner had appeared and that this brood had occasioned more injury than the first. A letter from the owner of the field, dated July 31st, stated that the miners were very abundant at that time, and occasioning considerable injury.

In 1906 my first visit to the field in question was made on May 30th, and at that time I found a few leaves with small mines in them. Some of the larvae taken from these mines measured 2 mm. in length. Considerable time was spent in the field, and I observed a number of small blackish-colored saw-flies flying about the plants and alighting upon the leaves. Some were evidently ovipositing, and the operation was observed. The insect would alight upon the upper surface of the leaf and select a spot for the deposition of the egg, apparently at random. Sometimes the place would be in the shade, sometimes in the sunshine, but so far as I could determine it was always upon the upper surface of the leaf. The tip of the abdomen would then be brought in contact with the leaf, and in a very short time, usually 30 to 50 seconds, the operation would be finished and the insect would fly away.

Some of the spots where eggs had apparently been deposited were marked, in the hope that later, with the aid of a microscope, I would be able to locate the eggs; but in this I failed. Several of the saw-flys were collected at this time, and one that was submitted to Dr. A. D. MacGillivray, was pronounced by him to be *Scolioneura capitalis* Norton.

This species was described by Norton in 1867,* as *Selandria* (*Blennocampa*) *capitalis,* from a single female taken at Brooklyn, N. Y. In 1895 Marlett re-described the species,† using Norton's type, and referred it to the genus *Scolioneura.* At the same time he described a new species of *Scolioneura, canadensis,* which, according to Dr. MacGillivray, is probably a form of *capitalis.* In 1884 Forbes bred from larvae found on mining leaves of cultivated blackberries at Normal, Ill., two specimens of the small saw-fly which were, according to Dr. MacGillivray, undoubtedly males of *S. capitalis,* but which Forbes described‡ as *Metallus rubi* (gen, et sp. nov.).** His description of the larva follows:

* Trans. Amer. Ent. Soc., Vol. I; p. 247.

† Proc. Ent. Soc. of Washington, Vol. III, p. 234.

‡ Fourteenth Report of the State Entomologist of Ill., p. 87.

**In 1887 Cresson referred this to the genus *Fenusa,* considering it possibly a variety of *F. curta* Norton.

"*Larva.*—The larva is 8.5 mm. in length by 1.25 mm. in breadth, cylindrical, skin minutely roughened. The second and third thoracic segments and the first abdominal are much thickened vertically, giving a convex dorsal outline to this region. From the second thoracic segment the outline slopes rapidly downward to the front, the head being wedge shaped, viewed laterally, and only about half the depth of the second segment. The head is flat beneath, slightly rounded above, about two-thirds as wide as the thorax; antennae and mouth parts very short; eyes wanting. The color is brown both above and beneath. First thoracic segment trapezoidal, viewed laterally; a large brown chitinous prosternal area extending forward to the mouth parts and laterally to the legs; a brown patch upon the dorsum of this segment. Small brown chitinous sternal areas to the two succeeding thoracic segments, and a still smaller one on the first abdominal.

"Legs very short, not longer than their respective segments; prolegs fourteen in number (counting the two anals), having the form of low, flattened tubercles, each with a brown chitinous patch upon the outer part. The pair of anal prolegs are nearly encircled by two dark brown chitinous arcs.

"Segments of the body deeply separated; sides with two lateral rows of obscure tubercles; spiracles brown, minute, except the first on the middle of the first thoracic segment, which is larger and is surrounded by a small brown chitinous patch."

"Described from a single specimen taken from the blackberry leaf."

My own material in this stage is all alcoholic, and hardly suitable for a close comparison with the above, or for descriptive purposes. Some of the larvae are considerably larger than Forbes' specimen, however, several of them measuring 10 mm. in length and 2 mm. in breadth.

The following description of the adult has kindly been furnished by Dr. MacGillivray:

Scolioneura capitalis Nort. ♀. Blackish rufous with the following parts rufous, the anterior and lateral lobes of the mesonotum, the scutellum and the post-scutellum; with the following parts white, the two basal segments of the antennae, sometimes, the apices of the coxae, the trochanters, the anterior and middle tibiae and tarsi, and the posterior tarsi; the posterior tibiae varying from a clear white to strongly infuscated; antennae enlarged at middle with the second segment annular, wider than long, the third segment one-third longer than the fourth, shorter than the third and fourth together; the clypeus *truncate;* the clypeal furrow shallow, interrupted at middle by

a distinct, convex hypoclypeal area; the ventral part of the antennal furrows extending from the tentorial invaginations, which are shallow, to a line drawn through the dorsal end of the antennal fovea, and slightly closed just above the base of the antennae by a low, transverse ridge; the dorsal part of the antennal furrow deep at each side of the postocular area, and fading out opposite the anterior ocellus; the postocular area bounded in front by a furrow uniting the antennal furrows of a side, from the cephalic margin of which there extends a wide depression, wider than the ocellus, to the anterior ocellus; the head not with a pentagonal area; the posterior metatarsus as long as all the following segments together; the saw guides straight on the dorsal margin, slightly convex on the ventral margin, and obliquely truncate at apex; the radial cross-vein ending in the cell R4 distinctly before its apex; wings infuscated, veins and stigma brown. Length 4 mm.

Hab.—Missouri (Riley), Illinois (Forbes), Rhode Island (Morse), and New York (Norton).

In notes appended, Dr. MacGillivray says:

"I have before me for study four specimens from the United States National Museum, all from the Riley collection, one bred from a leaf mine on blackberry, two types from Professor Forbes and a single specimen from Rhode Island. This species varies greatly in the amount and intensity of the rufous color on the mesonotum. The type of *capitalis* is apparently an immature individual in which the mesonotal markings are entirely wanting; in other individuals the mesonotum may be entirely blackish rufous, or with only slightly marked spots, or with the body shining black and with distinct rufous mesonotal area. Forbes' *Metallus rubi,* based on males, is black; the male of *capitalis* differs from the female only in having the mesonotum black, and is undoubtedly the same as Forbes' *rubi,* while Marlatt's *canadensis* appears to be simply a form of *capitalis* with a distinct black and rufous color."

In the Fourth Report* of the Delaware Experiment Station (1891) I find a note relative to a leaf-miner in blackberries, which I give herewith:

"Specimens of blackberry leaves infested by a leaf-miner were received June 25, from Mr. P. Emerson, Wyoming, Del.,

* Report of the Entomologist, M. H. Beckwith.

and also from Mr. L. E. Anthony, Smyrna, Del. The insects did not make mines of any particular shape, but destroyed the whole inner portion of the leaves, the upper and lower epidermis of the leaf only remaining.

The leaves were sent to me in a letter and all the insects had escaped. I endeavored to secure leaves that contained the insects, but was unable to do so. Mr. Emerson informs me that several blackberry plantations in that vicinity were quite badly infested and fears were entertained that serious damage would result if the insects continued to increase. I shall make careful observations during the coming season in the infested plantations."

This probably refers to this species, and is doubtless the first published reference to an injury by *S. capitalis* which could be considered as being of economic importance.

Owing to my failure in 1906 to secure the data that I desired relative to the life history of this leaf-miner, I made plans to carefully study the species in 1907; but owing to the unusually cold and wet spring weather that we had, or other unknown causes, the miner appeared in only very small numbers the past season. At the time of my first visit, June 4, I failed to find any of the adults or any signs of mines. On the 27th of June I again visited the place and spent considerable time in the field, but found only six or eight leaves that contained mines. One or two of the larvae in these appeared to be nearly full grown at this date. Some of the infested leaves were brought home and placed in a glass cylinder with cotton batting at top and bottom, and this was set away in my laboratory. On July 9th I found therein a specimen of a species of *Rhysipolis** which had apparently just emerged. This is therefore, presumably a parasite upon the larvae of *S. capitalis*.

Notes on Pachybrachys.

By Fred. C. Bowditch.

These preliminary notes are in the hope that collectors will give this neglected group some attention during the coming season, by collecting series of specimens with special reference to the locality and food plant and so facilitate further and more complete study of this genus.

* Determined by Mr. J. C. Crawford, through courtesy of Dr. L. O. Howard.

Through the kindness of Prof. Dr. O. Taschenberg of Halle, Germany, I have received the loan of the types of some of Suffrian's species, so that certain of his obscure forms can be accurately determined, but larger series are needed to define their limits.

The species which figures in our collections as the light variety of *P. striatus* Lec. = *pallidipennis* Suff.; probably Le Conte's name will remain for the so called black var. as a distinct species. The name of *bivittatus* Say should be attached to the species now commonly labelled *viduatus* Fab. The real *viduatus* occurs sparingly in the southern states, is much larger and stouter and has a very well marked M on the thorax. Mr. Löding has sent me several from Alabama and I have it from North Carolina and Georgia. Suffrian's description of *viduatus* fits this species very well and does not fit *bivittatus* at all.

Characteristicus Suff. is wholly grayish-white. I have typical specimens from Lake Worth, Fla., and New Jersey. It is rather flattened in shape; the type ♂ has only one unbroken (by punctures) elytral interspace running along the side from near the humerus. My specimens exactly agree with it in that particular. Query, as to the food plant? It is very close to *atomarius* Mels. which lives on oak.

Impurus Suff. is entirely rust colored with three darker spots on the base of the thorax, and three more along the side and two on the disk of each elytron. My specimens of this are neither of them exactly typical.

Peccans Suff. type is black and yellow, the former color predominating and with a round yellow spot in middle of each elytron. My specimens are not exactly typical. They come from Massachusetts and the Middle States.

Spumarius Suff. type ♂ is still yellower than *peccans* and has also a round spot on the elytra. I have one male example from Tennessee which is the counterpart of the type. Nothing is known of the habits or food plant of any of these four Suffrian species.

I note the occurrence of several Mexican forms from the Southwest, among them *laticollis* Jac. from Brownsville.

Migrating Butterflies.

By P. A. Saverner, Highland Park, Mich.

Point Pelee is a long, tapering point of land, extending from the north shore of lake Erie, about nine miles, near the western extremity of the lake. Out from the Point lie various islands situated like stepping stones across the lake to the Ohio shore. Along this point and its outlying islands, lies a great natural migration route, followed by birds on their vernal and autumnal migrations. During the last three falls I have done considerable ornithological work on the Point, and I have been much interested in observing that not only do birds habitually use this natural highway in crossing the lake, but that there is a regular and well defined stream of Lepidoptera flowing across in the fall. In the fall of 1905 during our stay from September 4th to 15th, we were greatly astonished at the numbers of *Anosia plexippus* present. They were to be seen everywhere, in ones, twos or dozens. In the woods, over the fields or along the roadside, and every here and there on the edges of the woods a tree would be found covered with them. One day, along the east beach, one of the few of the small cottonwoods that grow along the top of the sand dune was so covered with them that the whole lee side was a mass of red, their numbers almost hiding the green foliage completely. When we shook the tree they rose in the air in such a cloud that they could scarcely be seen through. We never saw them flying in flocks except when disturbed in some such manner as described above, when they would either fly to another adjoining tree in a straggling disorganized fashion or gradually scatter, and proceed, each insect for itself. Individuals seldom passed a resting flock but generally joined it and so it seemed that the flocks were built up by the gradual accession of stragglers.

The next year from September 15th to 22d, we saw the same thing but on not quite so great a scale, due likely to the lateness of the date.

This last fall from August 24th to September 6th they were nearly as numerous as during the first season, though we saw

no such great masses of them as those on the cottonwood above mentioned. With them we observed two other species numerous that on previous occasions we had not noticed. Not being an entomologist, however, I should hesitate to state that they were not then present. These two were *Papilio cresphontes* and a black swallow-tail not quite so large that I am fairly well satisfied was *P. troilus*. I collected specimens but inadvertently lost them so have to rely upon an uneducated memory and the probabilities. Of these two the former was slightly the more common but both were abundant. I understand that these latter forms are not supposed to migrate but here they were certainly, without exception, flying down the Point and crossing over the lake along the same course followed by the Monarchs. There was no indications of flocking in these two species nor did they seem to associate with each other or with *plexippus* but at all times of the day there was a steady stream of them, making in the same direction, steadily and without loitering.

The Point ends in a long sand pit which we visited almost daily, and on all such occasions, except during rather heavy winds, all three species came sailing out the Point to the extreme end and then launching directly out into the lake along the same route that most of the diurnal birds followed, not toward Pelee Island, the first of the island stepping stones that lies plainly visible some ten miles distant; but taking a more westward line that would carry them straight across the open lake. They came at the rate of about three a minute on fine days and *cresphontes* was the most numerous of them and there were fewer *plexippus* than *troilus*. It was most interesting to watch them come, and observe the regularity and apparent deliberateness of their movements. On calm days they came right down the center of the Point and followed every winding of the final sand spit to its extreme termination from whence they turned and squared away on the course as described before. At times when there was a little wind their proceedings were a little different. As soon as they reached the end of the heavier timber they kept well down in the

shelter of the dense red cedar and juniper growth as far as that went, and then crossed to the lee shore, and dropping down to near the water's edge, proceeded along in the cover of the sand dune until the first breath of the wind was encountered when they gradually rose in the air and started over the lake on the usual course. The exactitude with which they followed each other was remarkable. One could stand between two red cedars where they crossed to the shore and ninety per cent. of all butterflies would pass within striking distance of a net. Sometimes a lull would come in their procession and the last would be out of sight in the distance before the next appeared but when it came it would appear beating over the same clump of juniper and within a few yards of the exact spot in which the previous ones first hove into sight.

Whether these were all migrating in the true sense of the word or not I leave to the entomologists to decide. I can just record the facts as I saw them in the hopes that they may be of some interest to others of more experience in the ways of the Lepidoptera. One more fact may be worthy of mention. All specimens of *plexippus* seen were in good shape, with unworn wings while most of *cresphontes* and *troilus* were more or less worn, especially the latter, few of which had not lost part or all of their tails and were otherwise damaged though not enough to seriously impair their flight.

Some Larrid Wasps from Colorado.

By S. A. Rohwer, Boulder, Colo.

I wish to express my thanks to Prof. T. D. A. Cockerell, for going over my manuscript.

The types of the species here described are in my own collection.

Tachysphex nigrescens n. sp.

♀. Length 6 mm. Anterior margin of clypeus rounded out, without distinct lateral teeth, shining, sparsely covered with punctures; front dullish, densely and rather coarsely punctured; vertex shining, the punctures not as dense as those on the front; space between the

eyes at the top about half as great as the distance at the bottom; second antennal joint roundish, about one third the length of third, joints three and four equal; dorsulum shining, rather densely and finely punctured, truncate anteriorly; scutellum not as densely punctured as the dorsulum, metathorax dullish; metanotum distinctly punctured, a distinct longitudinal carina from middle of base extending to about the middle; lateral and posterior faces distinctly striated; posterior face with a shallow, circular fovea; abdomen shining, densely covered with extremely fine punctures; pygidium, narrow, obtusely pointed at apex, somewhat excavated above. Color black; palpi pale brownish; apical part of tegulæ, a narrow band on apex, and extending along side of each abdominal segment, apical joints of tarsi (more especially the posterior ones) reddish brown; face, pleuræ and inner side of tibiæ with sparse sericeous pubescence. Wings dusky hyaline, nervures dark brown.

Habitat.—Florissant, Colo., June 28, 1907 (S. A. Rohwer).

Known from *T. intermedius* Vier. (Douglas Co., Ka.), its nearest ally by its smaller size; front without groove between ocellus and insertion of antennæ; abdomen not, or but very slightly, covered with silvery pubescence.

In Fox's table in N. Am. Larridæ it runs to 17 where it runs out, falling between *punctifrons* and *aethiops*. It may be known from both of these by its smaller size, and from *punctifrons* by the absence of the dense sericeous pile, and from *aethiops* by the much clearer wings.

Tachysphex hitei n. sp.

♀. Length about 8½ mm. Clypeus truncate with a very minute obtuse lateral tooth, densely punctured except on the extreme apical margin which is shining; front densely, rather coarsely punctured; vertex with finer punctures; a somewhat indistinct line-like depression from lower ocellus to between antennæ, and a broader and more distinct one from ocellus to occiput; the depression behind lateral ocelli distinct; distance between eyes at the top about equal to the length of antennal joints two plus three; second antennal joint about one-third as long as third, dorsulum somewhat truncate at anterior margin, densely and finely punctured in general, but a spot on each anterior part more coarsely punctured; scutellum and postscutellum punctured like the greater part of dorsulum; metathorax densely punctured with medium size punctures, on posterior face there is a distinct elongate fovea; abdomen distinctly, though finely punctured above and beneath, ventral segments with a few long reddish hairs; pygidium distinctly margined, about twice as long as the width at base, apex

sharp, very finely punctured, with a few widely scattered large punctures. Color black; apical tarsal joints rufous; abdomen clear red, with triangular shaped patches of silvery pubescence on apical lateral margin on the first, second and third segments (this pubescence can only be seen in certain lights); face, pectus and lower part of pleuræ with silvery pubescence. Wings dusky hyaline, nervures black.

Habitat.—Jim Creek, Boulder Co., Colo., September 7, 1907 (Glenn M. Hite).

The pygidium is similar to that of *triquetrus* Fox (Nev.) but it is not that species.

Disregarding the pygidium it runs in Fox's N. Am. Larridæ, to *tarsatus* Say, but differs from that species as follows: punctures on the dorsulum not uniform throughout; posterior face of metathorax not striated but punctured; abdomen above with fine punctures; smaller size, etc.

It also seems related to *T. punctulatus* H. S. Sm. (ENT. NEWS, Sept. '06, p. 246) from Nebraska, but may be separated from that species by these characters; clypeus densely and rather coarsely punctured; different puncturing of the front; scape and mandibles without rufous; differently punctured dorsulum; abdomen clear red, with silvery pubescence at sides of first three abdominal segments, etc.

Tachysphex foxii n. sp.

♀. Length 8 mm. Clypeus rounded anteriorly, the apical margin slightly uneven, lateral teeth if present very small, rather densely punctured throughout; front with large well separated punctures, punctures on vertex not quite as dense; a distinct furrow from lower ocellus to near occiput; depression back of lateral ocelli rather distinct; space between eyes at the top a little more than the length of antennal joints three plus four; dorsulum, scutellum and postscutellum shining, with distinct well separated punctures; mesopleuræ and pectus similarly punctured; metathorax above reticulate to coarsely granular; metapleuræ densely coarsely punctured; posterior face somewhat indistinctly striated, with a distinct elongate fovea, which is wider at the top; abdomen with fine dense punctures above, except the apical margin of the second and following segments which are shining and without punctures, venter shining, without or with very few punctures; pygidium margined, about twice as long as the width at base, with a few widely scattered punctures. Color black; band on middle of mandibles and two apical segments of abdomen rufous (abdominal segments brighter rufous); sides of abdominal segments, face, lower half

of front, pectus, pleuræ somewhat, dorsulum, metanotum and posterior face of metathorax sericeous; wings hyaline, at extreme apical margin dusky; nervures dark brown.

Habitat.—Boulder, Colo., Aug. 30, 1907 (S. A. Rohwer).

Dedicated to Mr. W. J. Fox who has done so much to make North American Larridæ known.

In Fox's table (N. Am. Larridæ) this species runs to *T. acutus* Patt. (Conn., Ga., Fla.), but differs in the following points: occiput not emarginate when viewed from behind; front with distinct punctures; metapleuræ punctured; pygidium not more than twice as long as broad at base; apex of abdomen red, etc. It has much the general appearance of *T. terminatus* Sm. but differs greatly in sculpture. It is not *T. claronis* Vier. (Tr. Am. Ent. Soc., 1906) which is an ally of *T. terminatus* Sm.

Tachyspex foxii var. **alpestris** n. var.

♀. Differs from *T. foxii* in having the front more densely and finely punctured; the dorsulum more closely punctured; the two apical joints of the tarsi rufous; the metanotum with a little more gray hair; and is a trifle smaller.

Habitat.—Florissant, Colo., July 1, 1906 (S. A. Rohwer).

This variety comes nearer *T. terminatus* Sm. but is still quite distinct. It runs in Fox's table (N. Am. Larridæ) to *T. acutus* Patt.

Tachysphex parvulus Cress.

A ♂ collected at Florissant, Colo., June 15, 1907 (S. A. Rohwer), differs from the description of this species given by Mr. Fox (N. Am. Larridæ) as follows: First joint of tarsi reddish; the three apical segments and apical half of third black; base of first abdominal segment black; pubescence of face a trifle yellowish; tegulæ ferruginous; venation pale brown; length 5 mm.

Tachysphex æthiops Cress.

♀ Copeland Park, Boulder Co., Colo., September 6, 1907; N. Boulder Creek, Boulder Co., Colo., August 22, 1907, Canadian Zone. Both specimens taken by S. A. Rohwer.

Notogonia argentata Boe.

Boulder, Col., April 14, 1907, and August 30, 1907 (S. A. Rohwer).

Nitieliopsis plenoculoides Fox.

Florissant, Colo., June 22, 1907 (T. D. A. Cockerell).

Tachytes crassus Patt.

A ♀ from Boulder, Colo., August 26, 1906 (S. A. Rohwer), has four silvery bands on the abdomen, which would tend to run it into *T. columbae* Fox but the pubescence on the face is golden and the longest spur of the hind tibiæ is as that of *T. crassus*. Again *T. crassus* is known to occur in the west while *T. columbae* has not been recorded from the west. I have seen a typical specimen of *crassus* from Roswell, N. M. (Ckll.). This locality is new.

Notes on some Angolan Insects of Economic or Pathologic Importance.

By F. Creighton Wellman, Benguella, West Africa.

(Concluded from page 33.)

17.

No. 102. *Zonabris trifurca* Gerst. (Coleopt.)

This Meloid beetle is a prominent member of a group deserving mention because of their flower-feeding habits. Both flower and vegetable gardens suffer from their presence. As they occur in large numbers they are not easy to combat. Their life cycle is interesting in that their larvae are parasitic in the oothecae of Orthoptera. These beetles are very distasteful to most insect-eating animals, and are consequently wonderfully mimicked by widely different groups of insects. I am publishing in another journal* a study of this interesting subject.

18.

No. 17. *Sarcopysylla penetrans* L. (Siphonapt.)

This flea locally known as the "Ewundu" is a common pest throughout southwest Africa. It was brought to this country

*Deutsch Entomolog. Zeits.

in 1872 by the Portuguese from South America. Since then it has traversed the continent and is steadily pursuing its way around the world, having already been carried by coolies from East Africa to the Far East. *S. penetrans* in Angola lives in the dust, etc., on the floors of native Kraals, camps, etc. It bites all warm-blooded animals, including man, in the same manner as do ordinary fleas; but if a ♀ be impregnated, she takes advantage of her first chance to burrow into the tissues of some warm-blooded animal (often man) thereby occasionally causing tetanus, sepsis, gangrene, mutilation and (rarely) death of her host. Once ensconced, she matures her eggs, her abdomen, which admits of enormous distension, swelling during the process to the size of a sweet pea. There have appeared various accounts of the succeeding steps in the metamorphosis, many of them inaccurate. In books on zoology, pathology and medicine we read, for instance, such statements as these: The eggs are "not deposited while the parasite is in the skin, for the ova do not leave the body until the parent reaches the soil." "The female bores into the skin, and the escaping larvae give rise to ulcers." "The female lays her eggs in the skin and causes thereby intense inflammation." "After the eggs are laid (according to some before this process) the superjacent skin ulcerates and the chigger is expelled," etc., etc. During the examination of large numbers of natives in Angola, I have made the following observations, already published in another periodical,* concerning this disputed stage in the life history:

1. The eggs are always laid while the chigger is yet imbedded in the flesh of her host.†

2. They never hatch into larvae in the body of the parent.

3. They are not laid at one time in masses,† but discretely and sometimes at considerable intervals.

*American Jour. Med. Sciences, May, 1906.

†When artificially removed from the tissues of her host she behaves abnormally and extrudes all her eggs at once, but this does not form a real exception to the above statements, and only a few of the most mature eggs thus expelled will hatch out.

4. The shell of the parent, when dead and empty of eggs, usually dries up *in situ* without causing further trouble.

5. The eggs once having reached the dust of the floor develop precisely like those of many other fleas.

In the light of what has been said it will be seen that so long as natives go about with infected feet, chiggers will abound. Domestic animals, too, should be kept at some distance from white quarters and the floors of bungalows should be occasionally sprinkled with naphthol or kerosene. I have several times pointed out* that this flea is one of the principal factors in the production of the tropical disease known as Ainhum.

19.

No. 1067. *Calandra oryzae* L. (Coleopt.)

This troublesome weevil is a great nuisance in stores of mealies (maize) and other grain. A moth (not yet heard from) shares with it this evil reputation. The native blacks in order to preserve their seed corn, store it in earthen pots the mouths of which they seal with clay. The local name for the weevil is "Omelekese."

20.

No. 876. *Dorylus nigricans* Ill. (Hymenopt.)

This is the hated "army ant" of this district. Having been several times driven from my tent by them I can personally testify to their mandibular powers. In former days a favorite method of punishment inflicted by the native chiefs was to bind hand and foot the victim who was then thrown into a nest of "army ants"—here called "Ovisonde." Careful housewives, however, welcome the approach of the ants and joyfully vacate for them the bungalow. For after a column of "army ants" has minutely explored a dwelling not a bug, beetle, cockroach, mouse, rat, snake or other pest remains behind. Much has been written on the habits of these and related ants, so I will not extract in detail from my notes the observations there recorded concerning their column formations, tunnelling under streams, forming living bridges over water, removing or elevating obstacles from their line of march, etc., etc.

*Jour. Trop. Med., 1906 p. 31; Boston Med. and Surg. Jour., 1906 p. 489.

21.

No. 1441 *seq.* *Diacantha spp.* (Coleopt.)

There are a number of noxious Phytophaga which might be mentioned. Those named in the title of this note feed on Curcurbitaceae and especially destroy melons and cucumbers. Other allied beetles: *Monolepta ludrica* Wse., *Melinotoma spp.*, etc., also Curculionidæ, larvæ of Elateridæ (*Tetralobus mechowi* Qued., *et al.*), etc., are also common garden pests. My noxious Hemiptera and Lepidoptera have not yet been reported on.

22.

No. 1156. *Simulium damnosum* Theob. (Dipt.)

This tiny fly is possibly one of the most successful destroyers of patience and provokers of profanity in the Colony. Natives near wet plains sometimes are compelled to move their kraals on account of it, and I have had to break camp to escape a swarm. It crawls down one's neck and up one's sleeves and bites viciously, leaving a tiny red wheal which itches furiously and does not disappear for some time.

23.

No. 179. *Apis nigritarum* Lep. (Hymenopt.)

The common Angolan honey bee. The species, described from the Congo, is by some regarded as only a variety of *A. adansoni* Latr., and some authors regard both these forms as varieties of the common European honey bee. I have it on the authority of Professor Cockerell, however, that our Angolan *nigritarum* is not to be identified with the European species. The insect is of considerable economic importance, as the natives eat the honey; and beeswax is one of the chief exports of the colony. The hives are made of hollowed out pieces of log (sometimes of bark) and are hung or lodged in trees. Particular trees are considered to be good "bee trees" and are always provided with hives. When full, the bees are simply smoked out of the hives and allowed to go off to find another home. No attempt is made to keep them, or to attract new swarms. It may be said in passing that the Apidae of

Angola are of great interest, my small collection having already turned up several fine new forms, including a new genus. The peculiar abdominal pouches of the Xylocopid group, enclosing parasitic mites (*Paragreenia* Ckll.) is also most interesting, as is the mimicry and parasitism in the whole familly.

24.

No. 1554. *Tabanus biguttatus* Wied. (Dipt.)

This fly is representative of the powerful group which includes, in my collection, several new species. *T. latipes* Macq. is the handsomest member, while the one named in the title to this note is of special interest on account of its mimicry of a wasp. The two species here named, with several others (notably *T. socius* Walk. and *T. rubricundus* Walk.), make life a burden to cattle, and occasionally attack man.

25.

No. 1060. *Clytus semiruber* Qued. (Coleopt.)

A common Cerambycid beetle (represented here by a variety, probably new) which is typical of a large group. They do great damage to dry timber. *C. semiruber* (which is distasteful and rejected by insect-eating animals) is a Müllerian mimic of *Zonabris dicincta* Bert.

26.

No. 1555 *seq.* *Salius spp.* (Hymenopt.)

Such formidable wasps as *Salius vindex* Sm., *S. dedjax* Guér., and *S. regina* Sauss., are reinforced by scarcely less powerful representatives of *Scolia, Synagris* and *Sphex.* The number of species is very large in the region, and the more aggressive ones are best left alone. I once saw a gigantic *Salius* chase a native boy several rods. The sting of such wasps is severe. The group as a whole is a fine one and several of my specimens are new to science.

27.

No. 1246. *Haematopota ocellata* Wied. (Dipt.)

I have taken a considerable number of *Haematopotae* nearly a dozen of which have been pronounced new species. These flies are a terrible pest in the wet season, both to men and

animals. The nearly naked natives suffer badly, and I have seen even a phlegmatic donkey become excited over them. One sometimes sees a horse or mule with the side of its neck almost literally covered with the tormentors. They will bite through thin clothing.

28.

No. 63. *Anthia calida* Har. (Coleopt.)

The commonest of a group of valiant Carabidae, some of which are much larger than *calida*. When disturbed they eject an acid secretion from the end of the abdomen, which, if it reaches the eyes, causes pain and may induce inflammation. A large ant shares the same habit. A small snake defends itself in a similar manner, spitting venom several feet. I was once inclined to doubt the existence of the last named animal, but I finally saw the phenomenon with my own eyes.

29.

No. 1156. *Aulacaspis sp.* (Hemipt.)

A scale insect attacking the Grenadilla vine (*Passiflora edulis*) and the "Ocimania" tree (*Papaya vulgaris*). It was probably brought here on a tree (*Melia azedarach*) imported from Portugal and called by the colonists "Sycamore": or at least the scale seems to be very fond of this last species. This *Aulacaspis* is typical of a large group of scale insects which I have not yet been able to study carefully.

30.

No. 22. *Diamphidia locusta.* (Coleopt.)

This Chrysomelid beetle is by far the most startling insect in the list; for from its grub is extracted the lethal arrow poison of the Bushmen and their neighboring tribes. On the occasion of my first visit to Africa I had a specimen (larva) brought me, but was naturally very skeptical as to the statements accompanying it. The blacks told me that the bite of either the imago or the grub was fatal, and that either is used in preparing the arrow poison. Correspondence with various savants, however, has verified the local opinion of the deadly nature of the beetle, and I have according described my larva in another journal.* Various other substances are mixed with the

*Deutsch Entomolog. Zeitschrift, 1907 p. 17.

powdered grub, chiefly the watery extract of the bulb of *Haemanthus toxicaria*. In former times various species of *Strophanthus*, especially *S. lanosus* were also used.

31.

No. 870. *Pheidole punctulata* Mayr. (Hymenopt.)

These tiny ants are a troublesome pest. They are into everything. A dish of food, unless placed on a table the legs of which are set in tins of water, is almost immediately scented and explored by them; and in the dry season even a glass of water in a few minutes has a lot of them floating in it. Housewives are driven to despair and native cooks endure hard words and blows on account of *punctulata* the local name of which is "Olunjinji." Other ants in a less degree are guilty of the same proclivities. The ants of Angola seem to be closely allied to those of South Africa, and as yet only one new form has turned up in my collection.

32.

No. 133. *Epicauta sp.* (Coleopt.)

A plant-feeder and, like several of the preceeding, undesirable to have in the garden. This beetle is destructive to the flowers of potatoes and to bean plants. I should say before dismissing it, that this Meloid, if dried and powdered, will produce blisters just as do *Lytta vesicatoria* L., *Zonabris cichoreii* L., Z. *pustulata* Thunb. and the other species used medicinally in different countries. I am elsewhere* writing of the remarkable mimetic relations of Angolan *Epicauta* with other insects.

A study like the present must always remain incomplete. I hope, however, to add to the preceding observations other notes on the most interesting or important insects (from an agricultural or pathological standpoint) that come to my notice during my proposed collecting tours in West Africa. In conclusion I wish to thank several correspondents for determinations of specimens, among whom I must mention Professor Cockerell, of the University of Colorado, Dr. Forel of Yvorne, Switzerland, and especially my friend Dr. W. Horn of Berlin, the President of the German Entomological Society.

*Vide Deutsch. Entomol. Zeits.

Callosamia angulifera Wlk., n. var. carolina.

By Frank Morton Jones, Wilmington, Del.

♂.—Ground color of wings above, black, obscured basally with olive-brown hairs and more or less heavily overlaid with golden-brown scales. Discal mark, on primaries, yellow and prominent; on secondaries, absent or very faintly indicated. Transverse posterior line yellow, clearly defined interiorly, outwardly fading into a broad, powdery golden-brown area. Secondaries beneath with no light line; purplish-red, with no strongly-contrasting areas.

♀.—Very similar to typical *angulifera* above; the discal marks yellow, almost obsolete on secondaries. Beneath, the black transverse lines of *angulifera* are replaced with purplish-red, which also darkens the area beyond to as dark a tone as the remainder of the wing.

Described from fourteen males and ten females from Berkeley County, South Carolina.

The Carpenter Mud Wasp (Monobia quadridens).

By M. Tandy, Dallas City, Ill.

During the summer of 1907 it was my good fortune to come in possession of a very interesting and rare specimen of the nest containing the live pupae of the Carpenter Mud Wasp.

Usually this insect selects some partly decayed board in which to excavate its tunnel for a nest, which is usually several inches in depth, and partitioned off into cells about one inch each, in which are stored spiders; and one egg deposited in each cell.

Now this particular insect, the subject of this sketch, seemed to be of different mind from the rest of its kind, as is exhibited in its selection of new and partly manufactured material for its domicile.

Perhaps it had caught the spirit of the age of progress and invention, and responded to some mysterious and inexplicable desire to better its condition, to provide a newer if not more fashionable home, or it never would have invaded a sash and door factory to provide for the same, and select the best of finishing lumber—a block of cypress, which had been discarded in the manufacture of window frames—dressed on both sides and with a groove in the under side, as it reposed upon a lumber pile. On its upper side were six small partly decayed

places, which bear evidence that our insect novice still retained some of its "old fogy notions" by its efforts to excavate a tunnel for its home, in each of these decayed places, and abandoned them by reason of the silicified layers intervening between the annual growths, which are peculiar to this particular variety of wood, and which cause much trouble and annoyance to the manufacturer. What our little novice lacked in botanical wisdom it made up by experience, and we can imagine that, though it was thoroughly disgusted with its failure it still retained the proverbial "grit" of this family of insects, by the ready manner it adapted the mechanical groove in the block of wood to its own purposes. It now appears that our little novice made the best of its environments, and enlarged its plans in advance of any of its kind by planning a larger and more magnificient domicile, and proceed to divide up its newly acquired premises into twelve rooms and cells, neatly partitioned off with mud. In Comstock's Manual for the Study of Insects, page 658 is illustrated a nest of this insect, composed of five cells, but in this case, it was a home built with its own hands (?) and exertion—hence it did not feel equal to, or had no desire, provide a larger or more commodius domicile, as did the subject of this sketch.

Later in the season when a workman had occasion to take some material from this pile of lumber, in lifting the block containing this interesting specimen he discovered the peculiar and new form, and consulted the writer as to its identity.

The block being separated from the smooth plain surface of the plank below, exhibited a very perfect cross-section view of the nest containing the live pupae, and each pupa suspended in fine web so that it did not come in contact at any point with the walls of its cell, and no visible remains of food material with which the cells were first stored. The pupae are exactly, in shape and appearance like a very slender medicine capsule filled with a dark chocolate colored material and capped with white.

Thus, in many ways the interesting insect world contributes to the curiosity and wonder of the human kind.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., MAY, 1908.

Probably there is no entomologist who can recall without sadness or bitterness some favorable collecting place wiped out of existence by the extension of towns or cities, or by the removal of woods and thickets. Even without mentioning the necessity of forests as sources of lumber supply, as conservers of moisture, as health-restoring agencies and as recreation-areas, our fraternity ought readily to sympathize with those who are doing what they can to save the few large tracts of woodland which still remain in the eastern United States. One of these is in the White Mountains of New Hampshire, another is in the Southern Appalachians. Bills to acquire these two areas as federal forest reservations are now before the House of Representatives at Washington, and have been approved by the American Civic Association. At the present writing these bills are in the hands of the Judiciary Committee of the House where, some fear, they will slumber undisturbed until the end of the session.

Let all those who desire to see their country's natural resources preserved and strengthened, all those who love nature and out-door life, all naturalists, botanists and entomologists do their utmost by spoken word or written letter to make clear to their Representatives and Senators at Washington that these forests must be acquired for the Nation and forever by action of this present Congress.

It is suggested that in addition to the members from each one's own state and district, letters and resolutions insisting on such action be addressed at once to the speaker, Hon. Joseph G. Cannon; Hon. John J. Jenkins, Chairman of the Judiciary Committee; Hon. James A. Tawney, Chairman of the Appropriations Committee; and the Hon. Charles F. Scott, Chairman of the Committee on Agriculture, House of Representatives.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

Miss Edith Patch, State Entomologist of Maine, has been spending a few months at Cornell University.

It is announced that Dr. Thos. H. Montgomery, Jr., of the University of Texas, has been called to the head of the Department of Zoology of the University of Pennsylvania.

Prof. M. V. Slingerland, has just returned from Chicago, where he has been investigating the insect enemies of twine string, for the McCormick Reaper & Binder Company.

The first number of the Annals of the Entomological Society of America has appeared. It is a credit in every way to the Society and the Editorial Board. If future numbers maintain the same standard of excellence its future will be assured.

During the past season two distinguished foreigners, Messrs Walter Froggatt, Government Entomologist of New South Wales, and Dr. Manuel J. Rivera, Entomologist of Chili, have visited various entomological centres in the United States.

Charles Abbott Davis, curator of the Roger Williams Park Museum, Providence, Rhode Island, died Jan. 28th. He was deeply interested in entomology and published a number of papers on the subject, and possessed a valuable collection of insects.

Thrips tabaci Lind.—This insect has appeared in enormous numbers on onions at Yuma, Arizona, a place where (as I learn from Prof. R. H. Forbes) onions have not been grown before. I am indebted to Mr. Crane, of Yuma, for specimens.—T. D. A. Cockerell.

Mr. E. P. Van Duzee, has left for a month's collecting trip to Southern Florida. He wishes to look up the subtropical forms of *Hemiptera* and will make as large collections as possible. His brother M. C. Van Duzee will go as far as Jacksonville with him and collect principally *Hymenoptera*.

While collecting on Puget Sound during the summer of '07 a number of mollusks were collected and cleaned. When unpacking the shells on my return I found that a fly had oviposited in a number of the shells, pupated and emerged, being held by the paper about the shells. The specimen proved to be the blow fly *Calliphora* sp.

The shells of *Pterophytes foliatus* furnished the largest number of flies but other shells had also harbored them. The shelter of the shell and the food offered by the remains of the body of the mollusk which had not been entirely removed had furnished a very satisfactory home and diet to the flies. In most cases only a few flies had reached maturity possibly because of inadequate food.—J. W. Hungate.

ODONATA from the Huachua Mts., Arizona.—The two species of *Argia* mentioned in the list on page 45 of the NEWS for Jan., 1908, are *A. tonto* Calv., and *A. vivida*, var. *plana*, Calv.—P. P. CALVERT.

ON A DROLL STORY OF A GERMAN SCHOOLMASTER AND A U. S. A. MAJOR.—BY DR. WALTHER HORN (Berlin).—There was once a thin little schoolmaster in Germany, called "W. H." He was little and thin, as generally German schoolmasters are.

There was once also a large, big major in the U. S. A. named "Th. L. C.," an important fellow—a real Major.

The Major went out early in January, 1908, to fight against the schoolmaster.

The schoolmaster got awfully frightened. Poor little schoolmaster, what could he do?

The schoolmaster tried to write an epistle against the furious Major, but as often as he began to write "Th. L. C.," he wrote "Mo. T. Sch."—his "sense of intellectual perception" was really "very feebly developed." Finally he got an idea: he went out to catch two different grasshoppers, put each one in a separate glass, labeled them carefully "Th. L. C." and "Mo. T. Sch.," thinking that will help his memory to facilitate the distinction. Really the epistle advanced; but, alas, the next morning came, "Th. L. C." had moulted and looked now like "Mo. T. Sch."

Poor little schoolmaster, how were you taken in again!

There was still a little schoolboy named "H. R.;" clever in everything, only he had never succeeded in differentiating a positive from a comparative. He saw his master's sorrow.

"Master, what's the matter?"

The master told his bad story.

"Can I see the two grasshoppers, master?"

"Yes, my little boy, here they are."

"How are the mouth-parts of them, master?"

"Just the same!"

"And the claws"?

"One like the other!"

"How do the bugs spring, master?"

"Absolutely the same behavior!"

"Well," said the clever boy, "the bugs are really the same, only "*Casey*" should be perhaps the comparative of "*Motschoulsky*."

EFFECT OF THE PARASITISM OF TACHINA FLIES ON THE LARVAE OF *Phlegethontius sexta* JOHANSSEN.—At Paris, Texas, on September 6th, 1904, I found a nearly fullgrown larva of this species hanging head down from a tomato plant in a garden, the anal prolegs holding it. The body was limp, shrunken and decomposed, and literally full of the grubs of some tachina fly. Afterwards the body hardened and became brittle, finally cracking along one side, through which the maggots worked their way out. Eleven of them pupated on the surface of the

soil contained in a jar in the laboratory, while ten more pupated within the body of the host, the last three segments of which were packed tightly with them. Otherwise, the entire cavity of the body was empty. Twenty-one (21) flies were reared from this single larva. The length of the pupal instar of the fly from September 10th to September 27th, was 17½ days, probably lengthened somewhat by the dryness of the soil in the confining jar. The variation in size of the puparia was marked, ranging in length from 8.10 to 4.90 mm. with all gradations.

On October 8th and 9th, the grubs of this species of tachina fly were again found in two *sexta* caterpillars from tomato plants, and twenty-four (24) puparia were afterwards obtained from the hosts, averaging twelve (12) apiece. But four of these flies had emerged up to November 16, 1904. The two hosts showed symptoms similar to those of the first case. This parasite was kindly determined for me by Mr. C. H. Tyler Townsend, Division of Insects, U. S. National Musuem, as "*Argyrophylax protoparcis* Towns. (or a n.sp.?)."—A. A. GIRAULT, Paris, Texas.

Doings of Societies.

At a meeting of the Entomological Department of the Harrisburg Natural History Association held in the rooms of the Division of Zoology on the evening of April 9th at 8 o'clock; a resolution was passed to the effect that, hereafter an abstract of the minutes be submitted to the ENTOMOLOGICAL NEWS for publication in its columns. In the absence of the regular chairman, Mr. P. H. Hertzog consented to preside. Mr. Henry L. Viereck then spoke at some length on "The Possibilities of a Universal System of Scientific Nomenclature." He first gave a short review of the history of the Linnean System of nomenclature and of the difficulties which had been encountered in recent years because of the enormous increase in the number of described froms in all branches of zoology.

It became necessary that many points be arbitrarily defined in order to prevent inextricable confusion. He mentioned the work of the International Zoological Congress telling what it had accomplished and what it still hoped to do.

Mr. Warren S. Fisher then presented a paper on "Insects Injurious to Forest Products." Emphasizing the importance of the study of forest entomology, he outlined the methods of

work and study necessary for the student in this branch of entomology.

The insect fauna of forest products then received some attention and the economic relation of insects to forests was discussed.

After touching the subject of remedies and methods of preventing losses Mr. Fisher concluded with an interesting summary of the annual losses occasioned by insects to forest products and also to growing timber.

W. R. WALTON, *Secretary.*

The February meeting of the Heink Entomological Club of St. Louis, Mo., was held on the 16th of the month, Mr. C. L. Heink in the chair and nine members present.

Mr. Graf exhibited a dwarf specimen of *Catocala piatrix,* being less than half the usual size.

Mr. Schroers showed a pair of *M. pallescens,* taken at Jefferson Barracks, Mo.

Mr. Poepping displayed several *Rhodosia julia,* taken in north St. Louis.

Mr. Heink exhibited three specimens of *Ufeus sagittarius* taken in north St. Louis on the river bank, January 4, 1903; also a fine specimen of *Euerythra phasma* and a pair of *Euclea indetermina* bred from larvae taken at Meramec Highlands, Mo.

Mr. Knetzger exhibited a series of *P. asterias,* all bred, showing remarkable variation in the number of yellow spots (inner row) of the secondaries, one specimen being entirely devoid of these spots, another having but one spot, another two and so on up to the specimen with the full number of eight spots. The question as to whether the larvae of *P. asterias* showed proportionate variations in markings was discussed, since the black rings of the larvae producing females are much more pronouncedly marked than the rings of those producing males.

Mr. Kelbly read an interesting paper on his experience with various methods for the preparation of larval skins.

AUG. KNETZGER, *Secretary.*

The Heink Entomological Club of St. Louis, Mo. held its regular monthly meeting on March 14th, Mr. C. L. Heink, presiding and all members present.

Mr. Schroers reported that on February 14th a seemingly perfect specimen of *P. cresphontes* flew into his office through an open window, but escaped before he could make an effort to capture it.

Mr. Heink exhibited a large series of *Anthocharis,* including *A. genutia* and *A. olympia,* local forms. He stated that during many years of collecting about St. Louis, he has taken *olympia* almost every year, during the month of April, but only in one certain locality.

Mr. Poepping exhibited a series of *Conchylodes platinalis,* which he found in abundance last season.

Mr. Kelbly reported having taken that morning (March 14th) a fresh specimen of *E. claudia,* the wings of which were still flabby.

AUG. KNETZGER, *Secretary.*

The monthly meeting of the Brooklyn Entomological Society was held February 6th, President Pearsall in the chair and fifteen members present, with four visitors.

The evening was devoted to listening to an illustrated lecture by J. J. Levison, of the City Department of Parks, who has charge of the shade trees throughout Brooklyn and whose subject was: "the Enemies of our Shade Trees and Practical Methods of Combatting Them."

Insect enemies in Brooklyn are chiefly the tussock moth, *N. leucostigma* and the borer *Zeuzera pyrina.* The city is divided into districts for the *leucostigma,* each cleared in turn by scraping off the egg masses and burning them. Unfortunately the department has no supervision over back yards and other private property and the very people who make the most urgent requests upon the department are the ones who would not spend ten cents on bands to keep a fresh brood of caterpillars from ascending the trees. The only way to fight the *pyrina* is to pour a little carbon bisulphide in each caterpillar tunnel and plug it.

The bagworm *Thyridopterix ephemeraeformis, Datana, cecropia, cynthia* and *Hyphantria cunea* have been troublesome only locally and are easily picked off.

Fungus growth does far more harm to the shade trees than all insects combined. The Northern Maple and Oriental Sycamore are recommended for planting along the streets. The poplar has proved so unsatisfactory that its planting is now forbidden.

R. P. Dow, *Recording Secretary.*

The Brooklyn Entomological Society met at 55 Stuyvesant Avenue, March 5, 1908, President Pearsall and eleven members present.

There has been added to the archives of the Society a valuable collection of photographs of prominent entomologists of the world, presented by Mr. E. L. Graef. It was decided that each present member of the Society contribute his photograph and notice of his entomological career, in the hope that one or more, in subsequent years, achieve equal fame.

Mr. A. C. Weeks spoke on "A method of propagating and preserving insectivorous birds and constructing suitable nesting boxes."

Mr. Franck exhibited two specimens of *Hepialus auratus,* both males but dissimilar in size, taken by Mr. Pearsall on the summit of the Catskills. They were found sitting in dense woods. Less than half a dozen specimens of this species are known.

The black aberration of *Colias philodice* ♂ from Mr. Franck's collection, taken at Bethlehem, Pa., was closely examined. It is in ex larva condition. The inner portion, normally yellow was even a shade darker than the normally black margin of the primaries. The line of demarcation is perfectly distinct. The specimen retains the pink margins, especially of the secondaries, which is most marked in first and second broods.

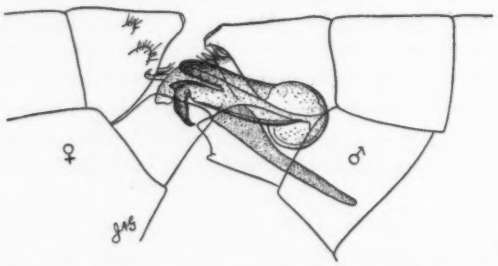
Mr. Engelhardt exhibited a *Brenthis myrina* ♂ taken by him at Overbrook, N. J., May 30, 1907. Its ground color was a rich chocolate, varying from almost black next the body to a shade

darker than normal at the margins. Its structure and its companionship with plenty of other *myrina* are all that identify it.

R. P. Dow, *Recording Secretary.*

At the regular meeting of the Feldman Collecting Social held March 18, 1908, at 1523 S. 13th St., Philadelphia, 14 members were present, Mr. Englehardt of Brooklyn, visitor.

Professor Smith reported on the study made of the genitalic structure of *Macrobasis ochrea.* He finds that there is a distinct correlation between males and females, so that copulation is rather difficult between specimens of markedly different sizes. A small male can copulate with a large female; but it would be difficult for a large male to copulate with a



small female. The male organs are furnished with a hook and in copulation the lower part of the terminal segment of the male slips under the lower part of the last abdominal segment of the female. The hook engages a slight thickening on the inner rim of the female segment and the lock is complete. It is almost impossible to get the specimens apart by a direct pull. A figure was exhibited which brought out these characters more clearly.

Professor Smith also read an interesting letter from Dr. S. S. Haldeman dated March 18, 1864, and addressed to Mr. J. H. Blakely, professor in W. F. Collegiate Institute of Wilmington, Del., giving details of how to collect and mount insects, same being explained by sketches.

Mr. Englehardt made some remarks on the New York and Brooklyn Societies and exhibited a box of *Memythrus* show-

ing the life histories and the great variation of this group and an undescribed variety and also explaining the habits. Discussed by the members.

Mr. Greene read a Dipterous communication from C. T. Greene on *Platypeza ornatipes* Townsend. Mr. Aldrich described this genus and its typical species from Champaign, Ill., in 1894. It has since been taken in Ithaca, N. Y., and Brookings, S. D. Mr. Greene took a ♂ specimen of this species at Lehigh Gap, September 25, 1906, sitting on leaf of wild grape, making the fourth record of its capture and the first in Pennsylvania. It has remarkable hind tarsi, a drawing of which was shown from Aldrich's paper in ENTOMOLOGICAL NEWS, 1906, p. 123, fig. 2.

Mr. Viereck mentioned larvae taken from decomposed maple and exhibited photo of same which is most likely a *Mallota*. He also showed photo of larvae taken from stomach of horse most likely *Gastrophilus equi*.

Mr. Kaeber said he had found larvae in hickory shoots (which had been injured by fire) at Clementon, N. J., in the spring of 1906. Judging from the amount of work done in the wood they had undoubtedly been there in the summer of 1905. The imagoes were cut from the same wood March 15, 1908, and turned out to be the Longicorn *Stenosphenus notatus*.

Mr. Wenzel had on exhibition the Coleoptera collected in Arizona last summer by his son Mr. H. A. Wenzel while in company with Mr. Kaeber. These filled twenty-one boxes and approximated 12,000 specimens. He made remarks on same, mentioning rarities and new species.

Dr. Skinner congratulated them on the fine collection and spoke of his trip to the same locality.

Mr. Huntington explained the new Lumiere color photography process.

Prof. Smith said his photographer had experimented with these plates and had succeeded in making beautiful lantern slides.

GEO. M. GREENE, *Ass't. Secretary.*

OBITUARY.

JAMES H. RIDINGS.

Mr. Ridings died suddenly on April 17th from paralysis of the heart. He was born in Philadelphia, June 12, 1842. He was the son of the late James and Diana Ridings. His father was a distinguished Philadelphia Entomologist and one of the founders of the Entomological Society of Philadelphia, afterward the American Entomological Society. Mr. Ridings was also fond of entomology and took a warm interest in the welfare of the American Entomological Society, having been its recording secretary for twenty-four years, serving from September, 1873 until December, 1897. He was a member of the Academy of Natural Sciences of Philadelphia and its entomological section and became a member of the American Entomological Society February 9, 1863. He will be greatly missed by his associates in the society.

Mr. Ridings leaves a wife and one daughter to mourn his loss. Services were held in All Saints P. E. Church and the interment was at Mount Peace Cemetery, April twenty-first.

PROF. WILLIS GRANT JOHNSON.

Mr. Johnson was born at New Albany, Ohio, in 1866, and after studying at the Ohio State University, took his B. S. and M. S. degrees at Cornell, specializing in economic entomology. Later he took advanced work in Leland Stanford University and served as instructor there. As instructor in the University of Illinois he conducted important investigations, continuing his work for the Laboratory of Natural History, and later was state entomologist of Maryland. After organizing the State Horticultural Department of Maryland and serving as its chief until 1900, he took up journalistic work as managing editor of the American Agriculturist. He then became associate editor of the New England Farmer and the Orange Judd Farmer, as well as the Agriculturist, and but a short time ago he was appointed one of the Board of Control of the New York State Experiment Station at Geneva. While living in New York City he was attacked by spinal meningitis and after some time of illness died in that place March 11, 1908. His body was returned to Ithaca and buried in Lake View.

Mr. Johnson was the author of several reports and bulletins as well as the Poultry Book, which was published in three volumes in 1903-4-5. While living in Palo Alto, California, he was married and is survived by his wife and several relatives.

EXCHANGES.

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Wanted.—A large number of all species of *Plusiotis, Prionus californicus, Derobrachus geminatus, S. cessus, julianus, Dynastes granti, Tetracha carolina, Pasimachus mexicanus,* all species of Cincidelidae and all other big beetles (Coleoptera) for cash or exchange. Kindly communicate with J. Sever, 335 E. 49th Street, New York City.

The undersigned, with a view of making as complete a State list as possible, desires to communicate with anyone who has collected Michigan butterflies or made notes upon the same. All such are asked to write.—Dr. W. W. Newcomb, 347 Trumbull Ave., Detroit, Mich.

Coleoptera for Exchange.—Canadian Coleoptera in papers, in every family, for North American ones. List sent on demand. Also a large number of exotic Coleoptera.—J. A. Jean, C. S. V., Ville St-Louis, Montreal, Canada.

Indian Insects in all orders. Specimens of *P. mayo, Kal. albofasciata, Hestia cadelli,* etc., from Andaman Islands, and *T. imperialis, A. camadeva, Phylliums, Phasmids* and live cocoons from Darjeeling and Assam.—A. Meik, 4 Convent Road, Entally, Culcutta.

Lepidoptera.—I would like to correspond with those who expect to collect for cash in new and little known regions, South and West, during the coming season.—John L. Healy, 312 City Hall, Chicago, Ill.

Coleoptera.—Nine double boxes containing named beetles to exchange for perfect Japanese gold fish.—Aug. Schmidt, 845 E. Russell Street, Philadelphia, Pa.

For exchange.—Named Coleoptera, *Cat. relicta, bianca, phrynia* and *S. columbia.*—A. W. Andrews, 186 Lothrop Ave., Detroit, Mich.

I have for exchange fine *Parnassius apollo, delius; Arg. dia, adippe, amathusia, pales; Van. io, urticæ;* many Erebiæ; *Sat. hermione, circe, alliona; Lycæna bellargus,* etc. Wanted cocoons of *cynthia, promethia,* etc., pupæ of *ajax, turnus, troilus, cresphontes, myops, geminatus* and others.—J. W. H. Harrison, 181 Abingdon Rd., Middlesbro' England.

Noctuidæ wanted in exchange. Am especially in need of a good series of *Mamestra nimbosa* at present. Have only Noctuidae to offer.—F. H. Wolley Dod, Millarville, Alta, Canada.

Will purchase or exchange *Catocala* of Missouri for a copy of Hulst's Monograph on the genus *Catocala.*—Ernst Schwarz, 6310 Newstead Ave., St. Louis, Mo.

Exchange.—Nine double boxes named Coleoptera and a number of Entomological papers; would exchange for perfect Japanese gold fish.—Aug. Schmidt. 854 E. Russell St., Phila.

Wanted.—Bibl. of Econ. Ent., parts 1, 2, 3, 6, 8; Insect Life, vol. iv, Nos. 9–12, vol. v, Nos. 6-12, vol. vi, Nos. 6-12; Lintner's 3rd and 4th Reports. I have for exchange parts of Insect Life, Expt. Sta. Record, Buls. Bur. Ent., Biol. Surv., etc.—C. O. Houghton, Newark, Del.

Wanted.—Cerambycidæ, Cicindelidæ and other Coleoptera in exchange for same from this locality. Bound vol. i, Trans. Am. Ent. Soc., 1867-8, to exchange for Horn's Monograph of the Tenebrionidæ.—C. A. Frost, 40 Grant St., South Framingham, Mass.

We offer a large number of North American butterflies in exchange. Butterflies from the United States named gratis.—Entomological Dept., Acad. Nat. Sci., Logan Square, Philadelphia.

Will collect in almost any order of insects this season in exchange for Coleoptera from other localities.—R. J. Crew, 72 Sarah Street, Chester, E. Toronto, Canada.

Natural History reports issued in 1853, with the explorations and surveys for the first Pacific Railroad, will exchange for Lepidoptera.—Geo. Rossiter, 52 Tiverton Ave., Toronto, Canada.

Lucanidae and Scarabaeidæ purchased from all parts of N. America. Send price lists.—Dr. Garry de N. Hough, New Bedford, Mass.

Wanted in exchange or for cash during the coming season fertile eggs of the Apantesis group, especially such of the Southern and Western States.—M. Rothke, 807 Harrison Ave., Scranton, Pa.

Pamphila sassacus.—I am particularly anxious to get by purchase or exchange eggs of this skipper, and should like to receive with the eggs the butterfly which laid them.—J. Fletcher, Exper. Farm, Ottawa, Can.

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